US-CL-CURRENT: 525/397,525/423 ,525/425 ,525/430 ,525/432
,525/537 ,525/905
,525/906 ,525/928 ,525/930

US-PAT-NO: 4340697
DOCUMENT-IDENTIFIER: US 4340697 A
TITLE: Heat resistant molding resin composition
DATE-ISSUED: July 20, 1982
INVENTOR-INFORMATION:

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US-CL-CURRENT: 525/420,525/397 ,525/423 ,525/425 ,525/430
,525/432 ,525/537
,525/905 ,525/906 ,525/913 ,525/930

ABSTRACT:
The present invention relates to a heat resistant molding resin composition comprising 99-99.9% by weight of an aromatic polyamideimide resin, and 1-0.1% by weight of a thermoplastic resin which comprises at least one member selected from the group consisting of a polyphenylene sulfide resin, a polyamide resin, a polysulfone resin, an aromatic polyester resin, a polyphenylene-ether resin and a phenoxy resin. The thermoplastic resin must have a melt viscosity at 390.degree. C. of not more than 1.times.10.sup.5 poise and a decomposition temperature of not lower than 350.degree. C. The aromatic polyamideimide resin is improved in melt viscosity characteristics by being blended with the thermoplastic resin. Therefore, a resin composition is obtained which is excellent in moldability characteristics. This composition may optionally comprise various kinds of fillers. Shaped articles, obtained by melt molding of the compositions in accordance with the present invention, are excellent in heat resistance, mechanical characteristics, electrical characteristics, sliding characteristics and solvent resistance characteristics

and may be
utilized in many different ways.
4 Claims, 0 Drawing figures
Exemplary Claim Number: 1

BSPR:
Polyimide resins, represented by the trademarks "VESPEL SP" of DuPont in the
United States and "POLYIMIDE 2080" of Upjohn in the United States, are very
excellent in heat resistance, mechanical strength, chemical resistance and
electrical characteristics, but they lack melt processability and cannot be
melt molded. In order to improve this defect, it has been proposed that better
melt moldability may be imparted to a polyimide, for example, "POLYIMIDE 2080"
mentioned above, by blending it with 30 to 50% by weight of polyphenylene
sulfide (U.S. Pat. No. 4,017,555). However, as the polyimide resin itself is
deficient in melt processability, a relatively large amount of the
polyphenylene sulfide resin is necessary in the blend for imparting an
acceptable melt processability to the polyimide. Therefore, the thus obtained
melt moldable composition exhibits poor mechanical properties in comparison
with the inherent properties of the polyimide itself.

US-CL-CURRENT: 251/312,267/159 ,277/523 ,277/530 ,411/544

US-PAT-NO: 4538790
DOCUMENT-IDENTIFIER: US 4538790 A
TITLE: Valve stem packing assembly
DATE-ISSUED: September 3, 1985
INVENTOR-INFORMATION:

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US-CL-CURRENT: 251/214,251/312 ,267/158 ,277/523 ,277/530 ,411/544
ABSTRACT:

A valve body has a stem passage rotatably receiving a valve stem. A packing surrounds the stem in the passage and a packing nut threaded on the stem applies axial force to radially expand the packing into sealing engagement with the stem and passage wall. Controlled slippage components interposed between the packing and packing nut allow rotation of the stem and packing nut without any rotational sliding movement against an end face of the packing. A packing support ring engages the end face of the packing adjacent the packing nut and includes a chevron surface for radially expanding the packing. A gland engages the support ring and a pair of reversely positioned spring washers are interposed between the gland and packing nut. During rotation of the stem, packing nut and spring washers, the gland rotates against the packing support ring. The chevron surface of the support ring includes notches for gripping the packing to prevent relative sliding movement therebetween. A

handle is
attached to the stem by a handle nut, and a spring washer interposed between
the handle and handle nut prevents loosening of the handle nut.
38 Claims, 5 Drawing figures
Exemplary Claim Number: 14
Number of Drawing Sheets: 1

BSPF:
The packing support rings are constructed of a polyimide plastic material, such
as Vespel (a trademark of E. I. duPont de Nemours and Company for specialty
polyimide plastics having high temperature resistance). Making the support
rings of Vespel instead of metal allows them to be constructed with an extra
close fit to the stem. If the Vespel rubs on the stem, it wears slightly and
does no harm. Metal support rings would score the stem, damage the surface,
and, in turn, damage the Grafoil wear surface. Hence, metal rings would
require larger clearances and this is not desirable because close clearances
are essential to prevent packing extrusion for maximum life.

BSPF:
Vespel also survives a fire. Even though Vespel is a synthetic and is
carbonized by the heat, there is no size loss. Vespel also retains enough
compressive strength to function during and after a fire. There are also other
new polymers which do not melt, burn, or vaporize, and these may be used
instead of Vespel.

BSPF:
A metal ring gland bears against the upper support ring, and turns with the
stem and slides on the ring. Vespel has good wear resistance and low friction,
so its flat upper face makes a good bearing for the gland. Using a metal ring
would preclude this solution for a rotational interface and would require some
other controlled bearing area. The gland also provides a rigid backing for the
Vespel support ring. The clearances for the gland are slightly larger to

preclude metal rubbing, but still close enough to support the Vespel and
prevent it from cracking at an unsupported edge.

BSPR:
The unique shape of the spring washers lock them to the flats of the valve
stem, assuring that the spring washers always turn with the stem and prohibit
sliding motion between the springs and handle. The outer edge of the lower
spring bears on the gland. Since there is almost a line contact, the unit
stress is very high as is the friction, effectively locking the spring and
gland together. Thus, the gland turns with the spring washers and stem, and,
in turn, must slide on the Vespel support ring. The packing nut bears on the
outer edge of the upper spring washer to create a strong locking action and
prevent the nut from loosening during cycling.

BSPR:
All of the foregoing discussion is based on the primary application of the new
packing assembly in a firesafe valve, but applies equally well to a valve
intended for normal service at elevated temperatures. This would be above the
range for a Teflon packing but within the capability of Vespel and numerous
other high performance polymers. In that case it may be desirable to replace
the support rings and the metal thrust bearing with a suitable plastic. The
principles and component functions would not be altered.

BSPR:
Finally, the same basic construction can be used to advantage in the normal
valve with Teflon packing, but not firesafe. In that case, the packing support
rings need not be chevron shaped, and could be constructed from a reinforced
Teflon ring instead of Vespel. The metal thrust bearing may be replaced by
some rigid plastic bearing material such as Vespel or a filled, reinforced
Teflon. The spring washers compensate for the very high expansion rate of

Teflon and prevent overloading the less rigid bearing.

DEPR:
In the preferred form, all of the metal parts are of suitable stainless steel.
Packing 54 comprises a wire reinforced Grafoil, while support rings 50,52 are
constructed of Vespel which is fifteen percent (15%) graphite filled. However,
it will be recognized that many of the features of the present invention may be
used with packings and support rings or other materials and that some or all of
the metal parts may be replaced with appropriate different metals or plastic
materials. Such modifications and/or substitutions may be desirable to
accommodate different valve applications.

US-CL-CURRENT: 137/516.29,137/540 ,137/543.17 ,137/843 ,251/333 ,251/334
,251/368 ,417/566 ,417/567

US-PAT-NO: 4368755
DOCUMENT-IDENTIFIER: US 4368755 A
TITLE: Valve assembly
DATE-ISSUED: January 18, 1983
INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
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US-CL-CURRENT: 137/512.3,137/516.29 ,137/540 ,137/543.17 ,137/843 ,251/333
,251/334 ,251/368 ,417/566 ,417/567

ABSTRACT:
There are disclosed herein several embodiments of a pressure responsive discharge valve assembly particularly adapted for use in reciprocating type gas compressors. The valve assembly includes a discharge passage valve seat of frusto conical shape in which a generally complementary shaped light-weight valve member is disposed. The valve member is preferably formed from a polymeric material, but may also be formed of metal. The materials used and the relative geometry of the valve seat and member are such as to reduce clearance or reexpansion volume, provide quiet closure with good sealing, long life and high speed operation, and still have the required flow areas at low valve lifts, thereby providing improved flow characteristics and efficiency. The included angles of the valve and seat are slightly different to provide progressive closing and sealing without permanent deformation. The valve concepts are also disclosed embodied in two other known types of valves in which the valve element is provided with a central opening and associated closure means to provide additional discharge flow area. The closure means in one embodiment is in the form of a fixed member and in another

embodiment is in
the form of a second separately biased movable valve disc member.
The
discharge valve of the present invention is also shown in
combination with
several different types of known suction valves.
36 Claims, 15 Drawing figures
Exemplary Claim Number: 1
Number of Drawing Sheets: 3

DEPF:
At the present time the preferred material for the valve member
is "Vespel", a
polyimide resin available from duPont Company, Wilmington,
Delaware. The
compositions identified as "SP-1" and "SP-21" have been found to
give excellent
results. The use of such a polymeric composition for discharge
valve member 30
facilitates easy fabrication, such as by molding, and the
relative light weight
of the valve member facilitates high speed operation due to the
reduced inertia
of the valve and the ability to use lighter springs, as well as
reducing noise
generated by contact of the valve and valve seat. The "Vespel"
material is
ideally suited for such application as it is able to resist
degradation from
relatively high temperatures and is unaffected by either
refrigerant gas or
lubricant. It has been found that the maximum operating
temperature to which
the refrigerant and lubricating oil can be subjected without
damage is less
than that for "Vespel". "Vespel" is also compliant enough to
seal without
permanent deformation.

DEPF:
Other suitable polymeric materials having the noted
characteristics which it is
believed may also be used, include those commercially available
under the
trademarks "Vespel" KS (an aramid resin available from the duPont
Company),
"Sparmon" (a polyimide resin available from Sparta Mfg. Co.,
Dover, Ohio),
"Valox" 420 or 420-SEO (a glass reinforced, thermoplastic
polyester available
from the General Electric Co., Pittsfield, Mass.), "Ryton" (a

polyphenylene
sulfide available from Phillips Petroleum Co., Bartlesville,
Okla.), and
"Torlon" (a poly (amide-imide) resin available from Amoco
Chemicals Corp.,
Chicago, Ill.).